



PUMA VTS series

PUMA VTS1214 / 1620

Large Vertical Turning Center with RAM Head Spindle



Doosan Machine Tools

Optimal Solutions for the Future

PUMA VTS series

PUMA VTS1214 / 1620

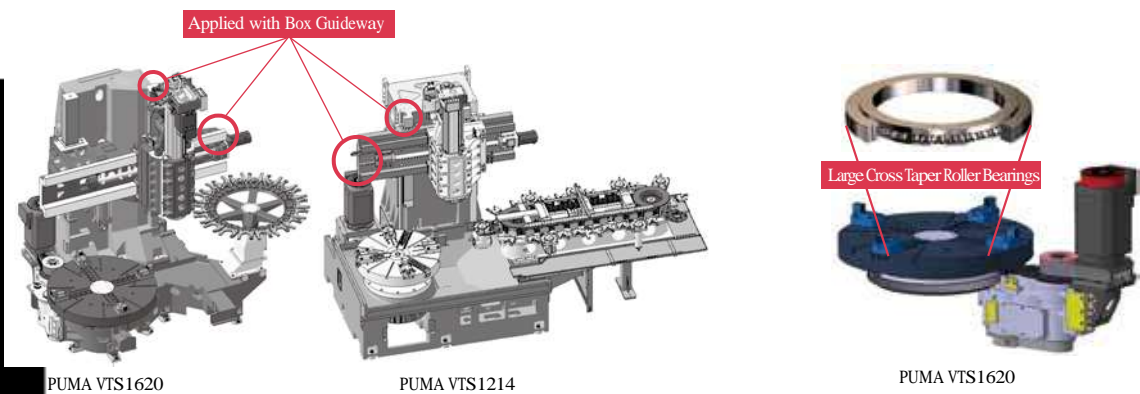
With its large capacity and heavy duty machining capability,
The PUMA VTS series provides excellent productivity for large workpieces



Features

Robust Structure

The PUMA VTS series provides optimum durability by including box guideway construction to all linear axes. The large diameter cross taper roller bearing used in the spindle construction provides high rigidity and accuracy for heavy duty machining applications



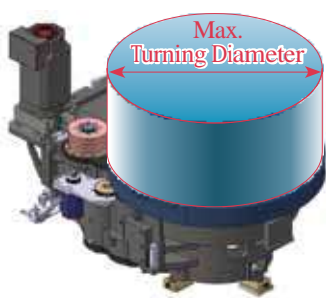
2 Highest Cutting Capacity among Competitors

Provides maximum workpiece size capacity

Max. Turning diameter

PUMA VTS1620
Ø 2000 mm
(78.7 inch)

PUMA VTS1214
Ø 1350 mm
(53.1 inch)



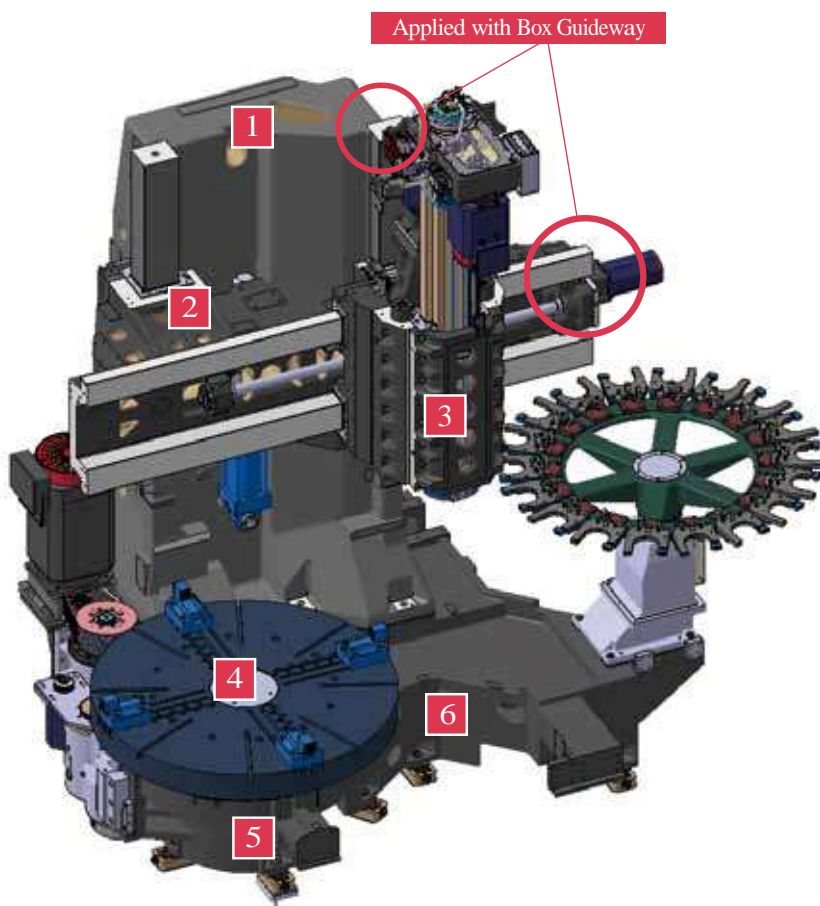
Robust Mechanical Construction

PUMA VTS1620 series

The PUMA VTS1620M series provides extended durability and stable accuracy by implementing a large diameter cross roller bearing for the spindle and box guideways for the linear axes.

PUMA VTS1620 series

Machine Construction



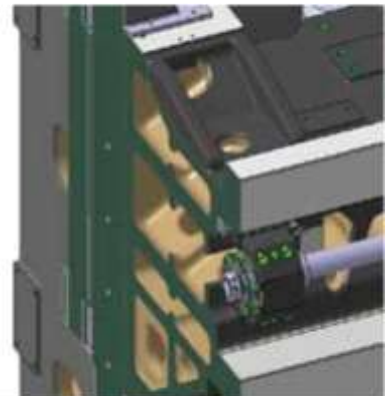
Model : PUMA VTS1620 Core Machine

1



A highly rigid X-type cast Meehanite column structure reduces deflection and ensures optimum cutting performance.

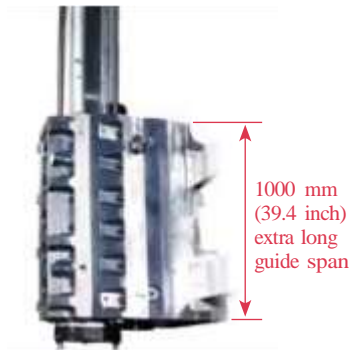
2



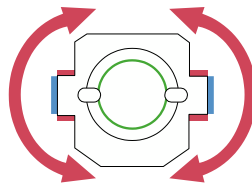
Deflection is avoided by the high rigidity crossrail and ram carriage construction.



3



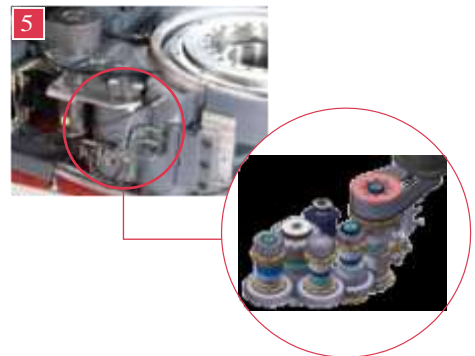
Large square cross-section
308 × 250 mm
 (12.1 × 9.8 inch)



Wide ram guide for
 high torque

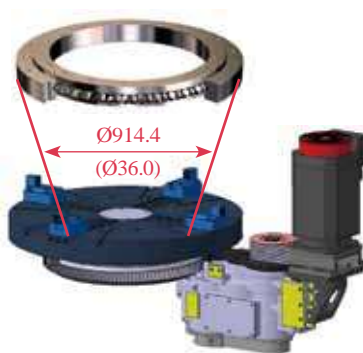
Ram deformation minimized by enlarged guideway design enabling heavy duty cutting.

5



Applied with powerful helical gears to guarantee a long life. The VTS1620M is applied with a zero backlash system to realize accurate C axis control.

4



Designed with large diameter cross taper roller bearing featuring high rigidity in both radial and axial directions. The gears are capable of transmitting high cutting forces.

6



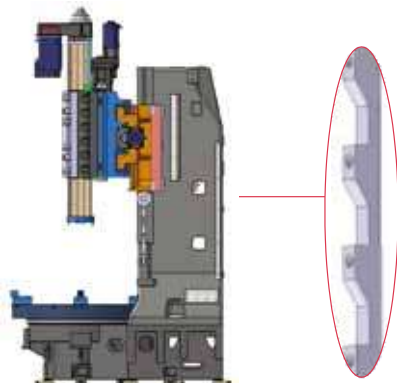
Designed in a base structure that provides a stable cutting performance to the table and carriage, using an X rib structure Meehanite casting.

Max. Table motor	Max. Table torque	Max. Table speed
45 {60} kW (60.3 {80.5} Hp)	19875 {24380} N·m (14667.8 {17992.4} ft·lb)	250 r/min { } : Option

Large Workpiece Capacity and Processing Capability

Crossrail Fixed Positions

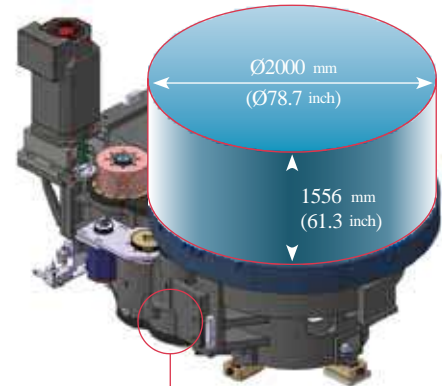
The 4 position step block is provided to fix the W axis position of the crossrail, and in combination with a positioning pin, maintains a high level of positioning control.



Crossrail fixed positions

200 mm × 4 steps = 800 mm
 (7.9 inch) (31.5 inch)
 (actuated by hydraulic cylinder)

Axis Travel



The built in 2-step gearbox provides a stable high torque drive

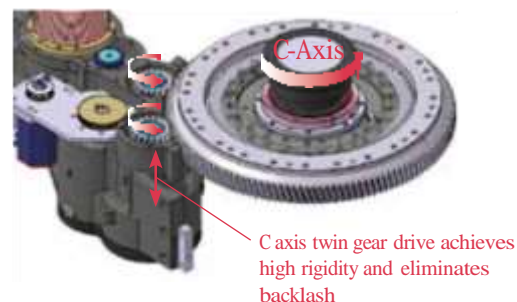
Max. Turning diameter	Ø2000 mm (78.7 inch)	Z-axis	960 mm (37.8 inch)
Max. Turning height	1556 mm (61.3 inch)	W-axis	800 mm (31.5 inch)
Max. Allowable load	10000 kg (22045.9 lb)	X-axis	1727 mm (68.0 inch)

ATC Magazine



Driving system	Servo motor
No. of tool stations	18 {24} stations
Max. Tool length in Z-axis	450 mm (17.7 inch) (Static tool) 350 mm (13.8 inch) (BT50/DIN 50 rotating tool)
Max. Tool weight	50 Kg (110.2 lb)/tool { } : Option

C-axis Table



C axis twin gear drive achieves high rigidity and eliminates backlash

C-Axis Servo Motor VTS 1620(M)

Max. Power and torque	4 kW (5.4 Hp) 26400 N·m (19483.2 ft·lb)
C-axis feedrate	900 deg/min (travel 360°, 0.001° control)

Servo controlled c-axis table enables milling, drilling and tapping with excellent rotational accuracy and user satisfaction.

Table Motor Power - Torque



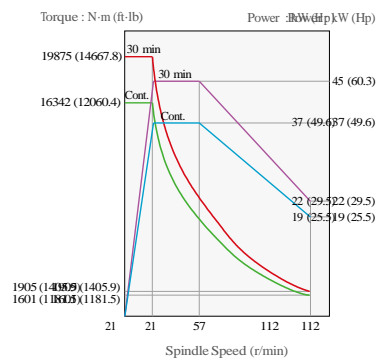
Max. Table motor & torque

45 kW **19875 N·m**
(60.3 Hp) (14667.8 ft·lb)

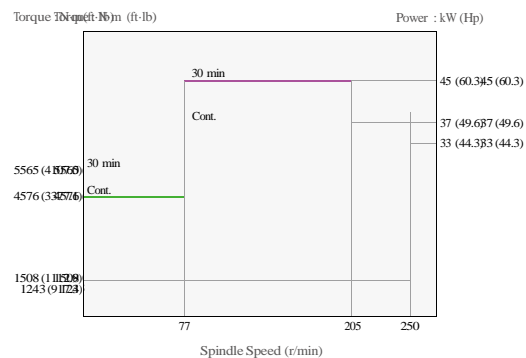
Max. Table motor & torque **opt.**

(80.5 Hp) **(17992.4 ft·lb)**

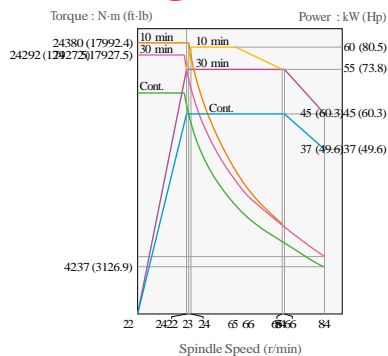
Low Gear



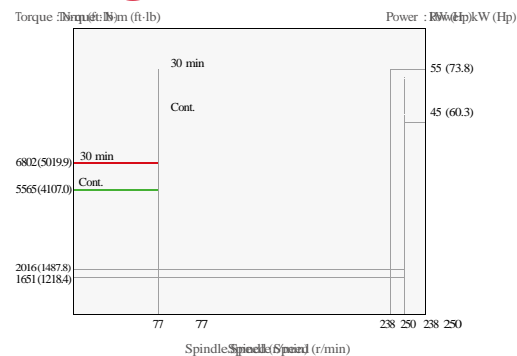
High Gear



Low Gear **opt.**



High Gear **opt.**



Ram Rotary Spindle

(common for PUMA VTS1214M/VTS1620M)

Max. Rotary tool power

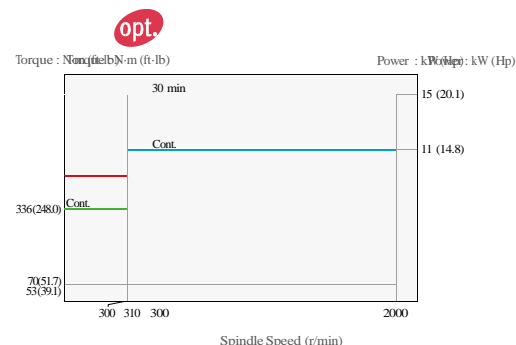
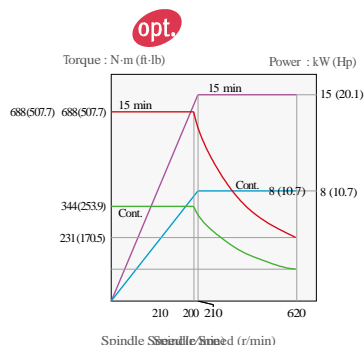
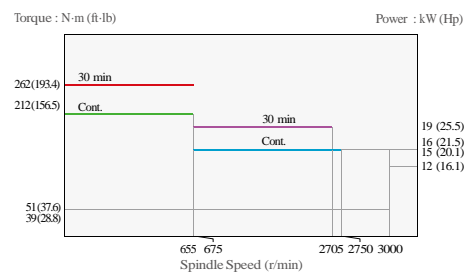
18.5 kW **15 kW **opt.****
(24.8 Hp) (20.1 Hp)

Max. Rotary tool torque

(193.4 ft·lb) **(507.0 ft·lb)**

Max. Rotary tool speed

3000 r/min **2000 r/min **opt.****



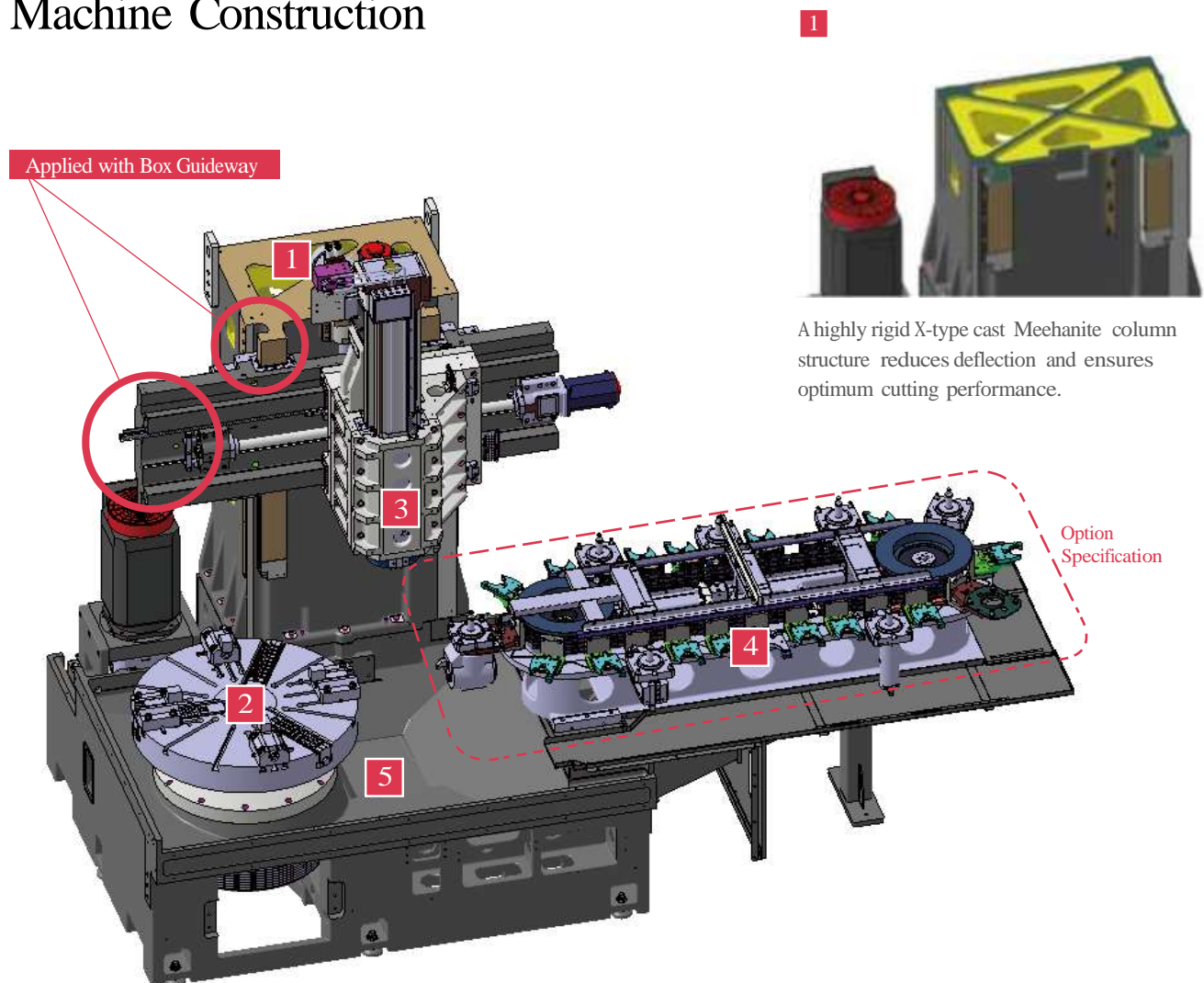
Robust Mechanical Construction

PUMA VTS1214 series

The PUMA VTS1214 series has minimized heat and vibration emissions using a separable-type gearbox, and it exhibits a high rigidity in heavy duty cutting using large bearings.

PUMA VTS1214 series

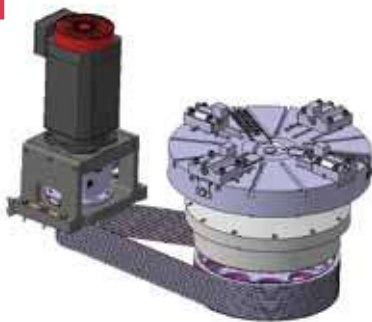
Machine Construction



Model : PUMA VTS1214 Core Machine



2



Vibration and heat generation at the spindle are minimized with a belt-driven, detachable gearbox. Cutting capacity and safety are enhanced with large diameter bearings.

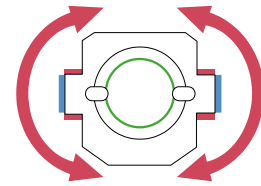
3



Ram deformation is minimized with an enlarged guideway. A wide ram guide enables heavy duty cutting.

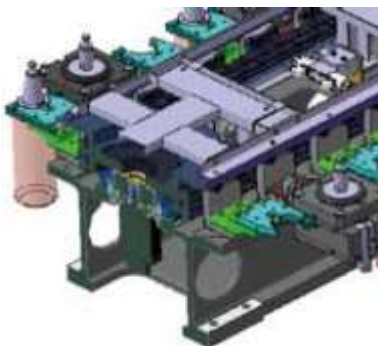
Large square cross-section

308 × 250 mm
(12.1 × 9.8 inch)



Wide ram guide corresponding to high torque

4



24 tool magazines are reinforced with a rigid rib structure for maximum stability. **opt.**

5

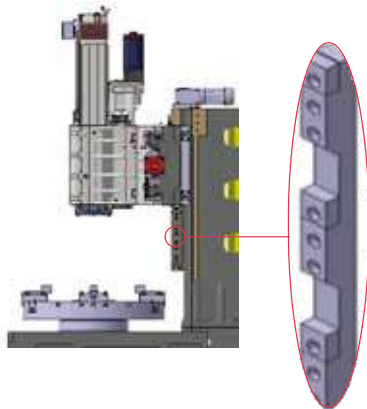


The column and spindle are rigidly supported using a grid-type, rib structure Meehanite cast. Chips can be easily discharged through the sloped top surface.

Cutting Capacity

Crossrail Fixed Positions

The 4 position step block is provided to fix the W axis position of the crossrail, and in combination with a positioning pin, maintains a high level of positioning control.

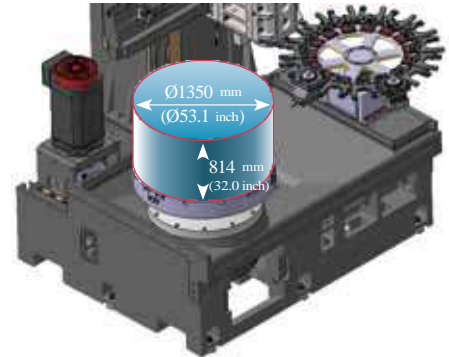


Crossrail fixed positions

150 mm × 4 steps = 600 mm
(5.9 inch) (23.6 inch)

(Geared motor control type)

Axis Travel



Max Turning diameter	Ø1350 mm (53.1 inch)
Hydraulic chuck	40 " {50 "}
Swing over bed	1400 mm (55.1 inch)
Max. Workpiece length	814 mm (32.0 inch)
Max. Workpiece weight	4000 kg (8818.4 lb) (Including chuck) {} : Option

Z-axis	W-axis	X-axis
800 mm (31.5 inch)	600 mm (23.6 inch)	1450 mm (57.1 inch)

ATC Magazine



Driving system	Servo motor
No. of tool stations	15 {24} stations
Max. Tool length	450 mm (17.7 inch) (Static tool) 350 mm (13.8 inch) (BT50/DIN 50 rotating tool)
Max. Tool weight	50 Kg (110.2 lb)/tool {} : Option

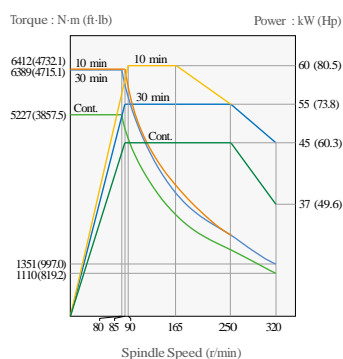
Table Motor Power - Torque



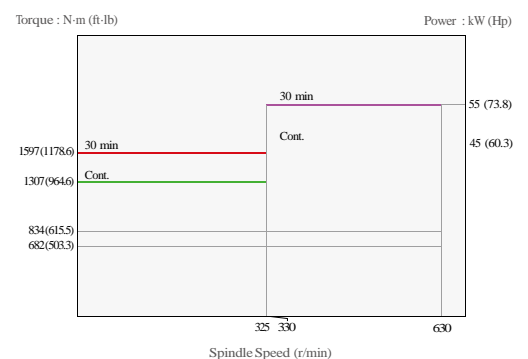
Max. Table Motor & Torque

60 kW (80.5 Hp)
6412 N·m (4732.1 ft·lb)

Low Gear



High Gear



Optional Equipment and Chip Disposal

Optional Equipment



Auto door cylinder



Linear scale



Auto tool setter



Oil mist collector (except PUMA VTS1620)



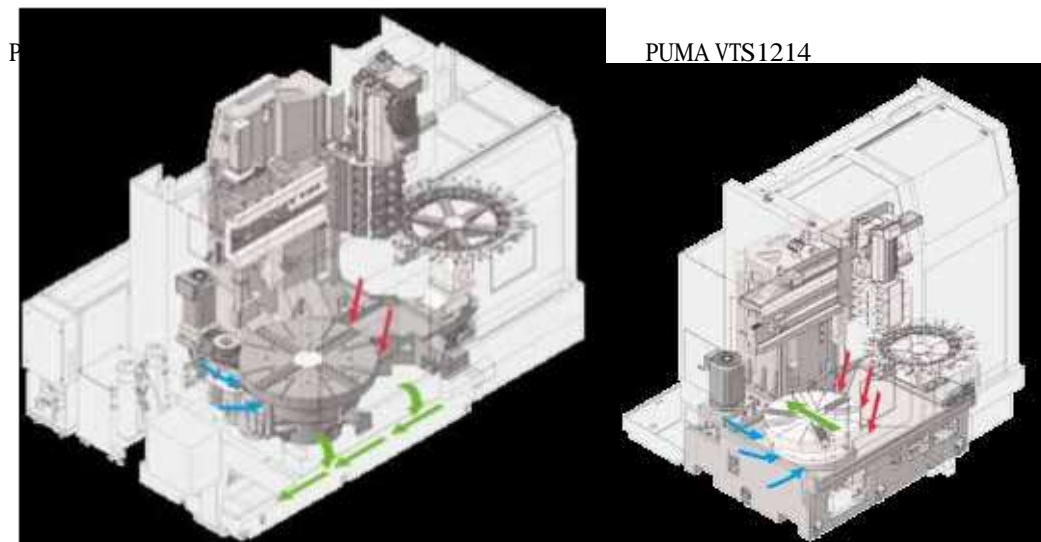
Oil skimmer



Automatic pallet changer

Easy Chip Discharge Design

Chips falling off to the left and right are collected in a chip pan and removed by a chip conveyor.



← ATC shower
← Base shower

Chip conveyor opt.



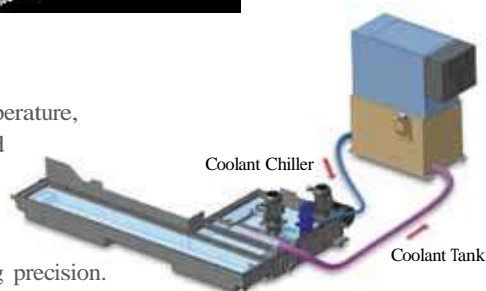
Hinge type



Scraper type

Coolant Chiller opt.

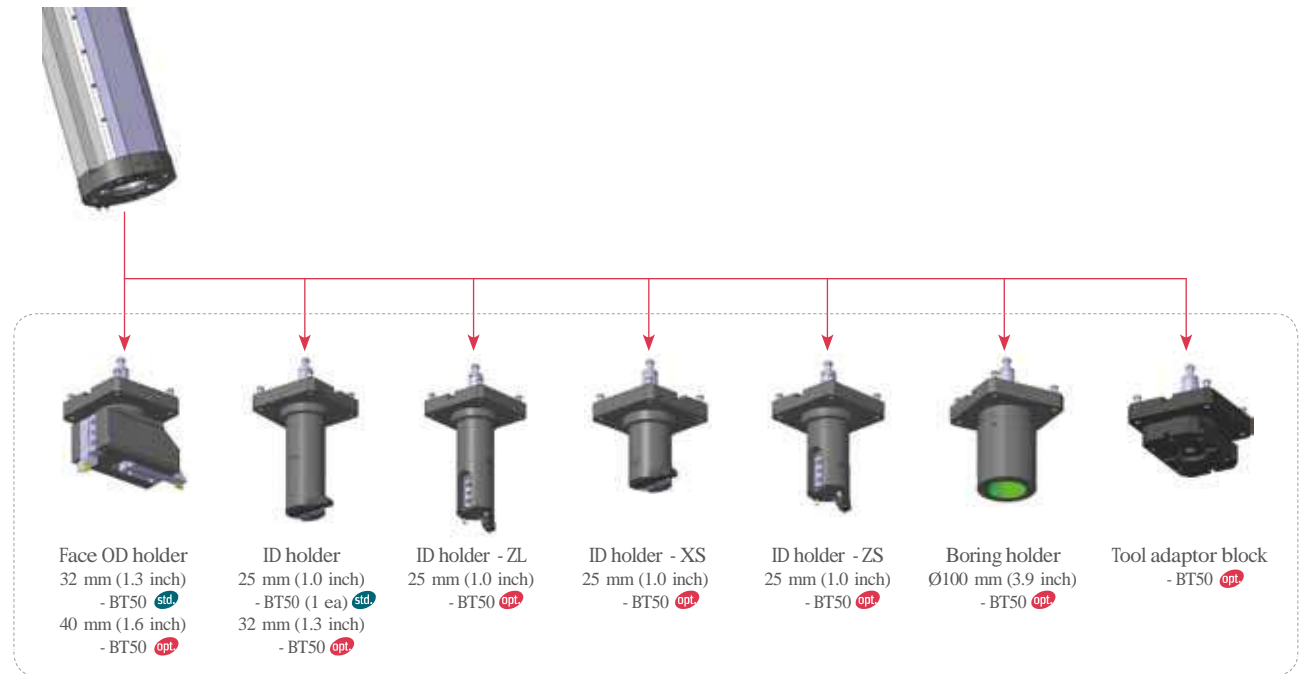
The coolant chiller lowers coolant temperature, helping to cool both the workpiece and tool during the machining operation. When using insoluble cutting oils, a coolant chiller is recommended to cool heated oil and preserve machining precision.



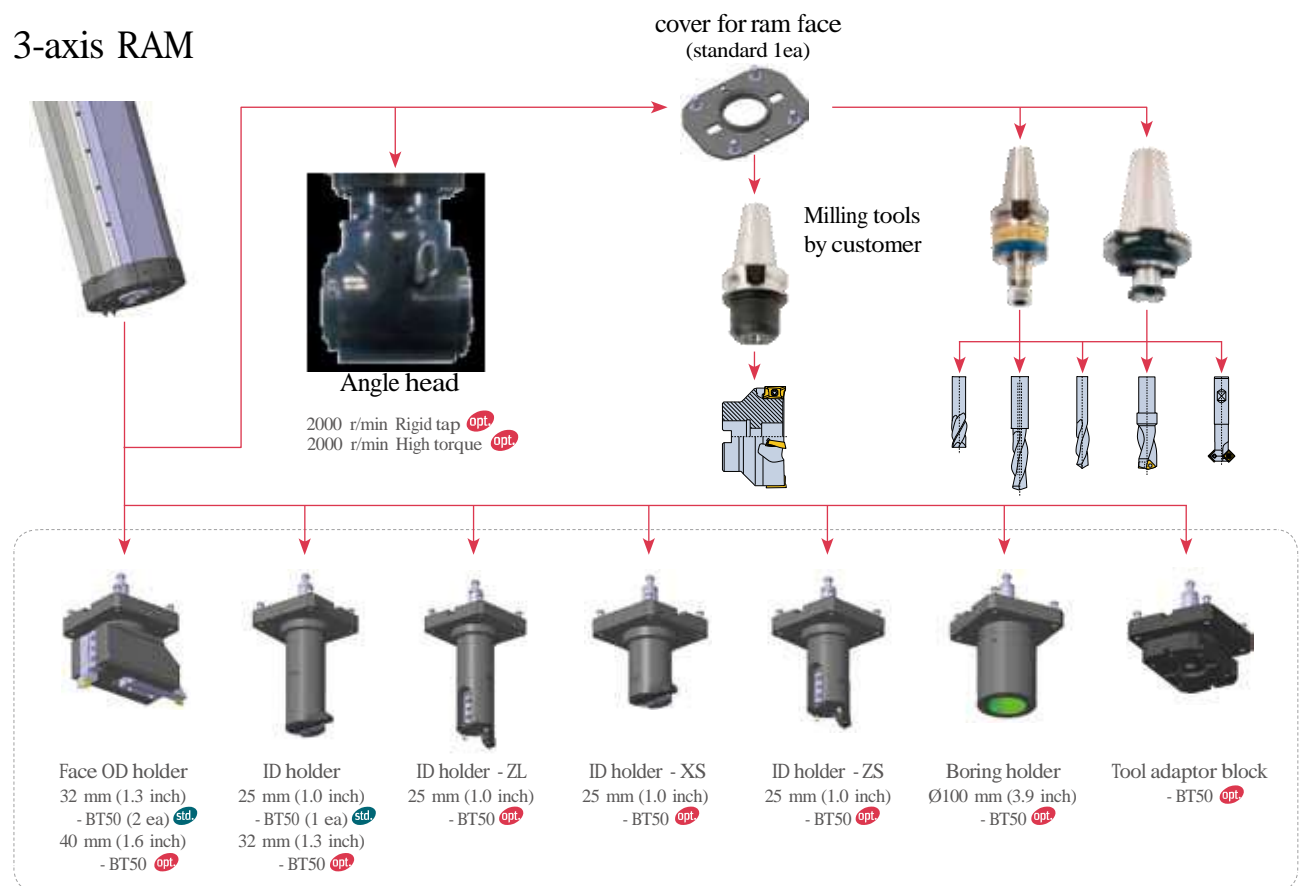
Tooling System

2-axis RAM

Unit: mm (inch)



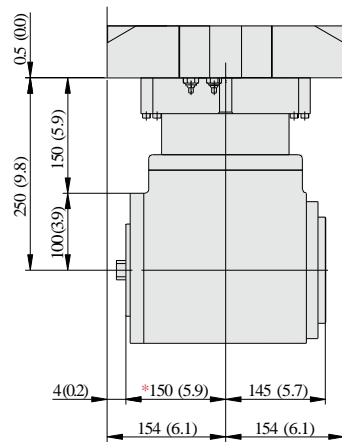
3-axis RAM



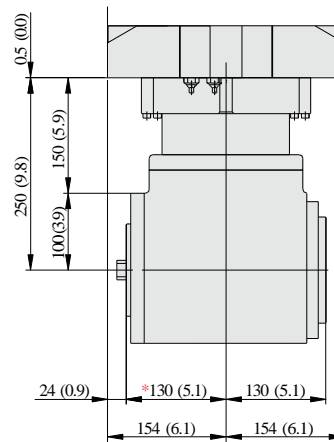
Tool Holder Dimintions

Unit: mm (inch)

Angle head **opt.**



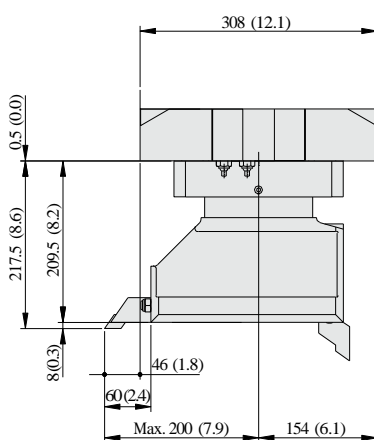
1:1 Rigid tap



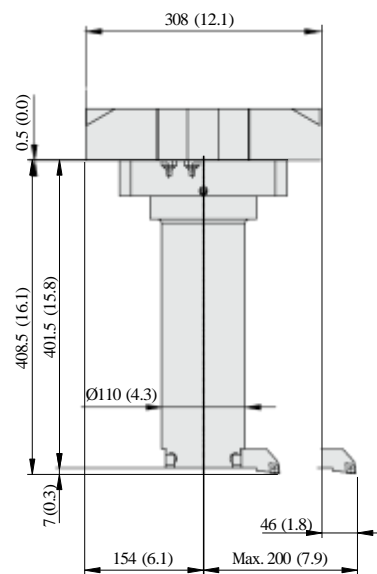
3:2 High torque

* If the magazine is attached, tools are need to separate.

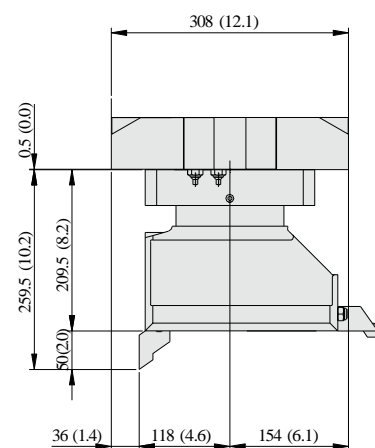
OD holder



ID holder



Face holder



Easy CNC Set-up and EOP

Easy Set-up



Operating console

- ① Doosan-Fanuc i series
- ② 10.4" color TFT LCD Monitor
Various alarm messages indicating errors from the machine and controller will be displayed on the 10.4" LCD screen, enhancing the operator's convenience.
- ③ PCMCIA Card
- ④ USB Port
(only DOOSAN Fanuc i series)
- ⑤ Ethernet function (embedded)
- ⑥ Swivel-type Operating Console
- ⑦ Part program storage
1280m(512kB)

ATC Guidance

ATC guidance main screen display



Guidance screen for ATC tool change



Tool holder information screen



Cross Rail Manual Fine Feeding

Fine feeding for the cross rail service and adjustment



Select jog mode for fine feeding of cross rail

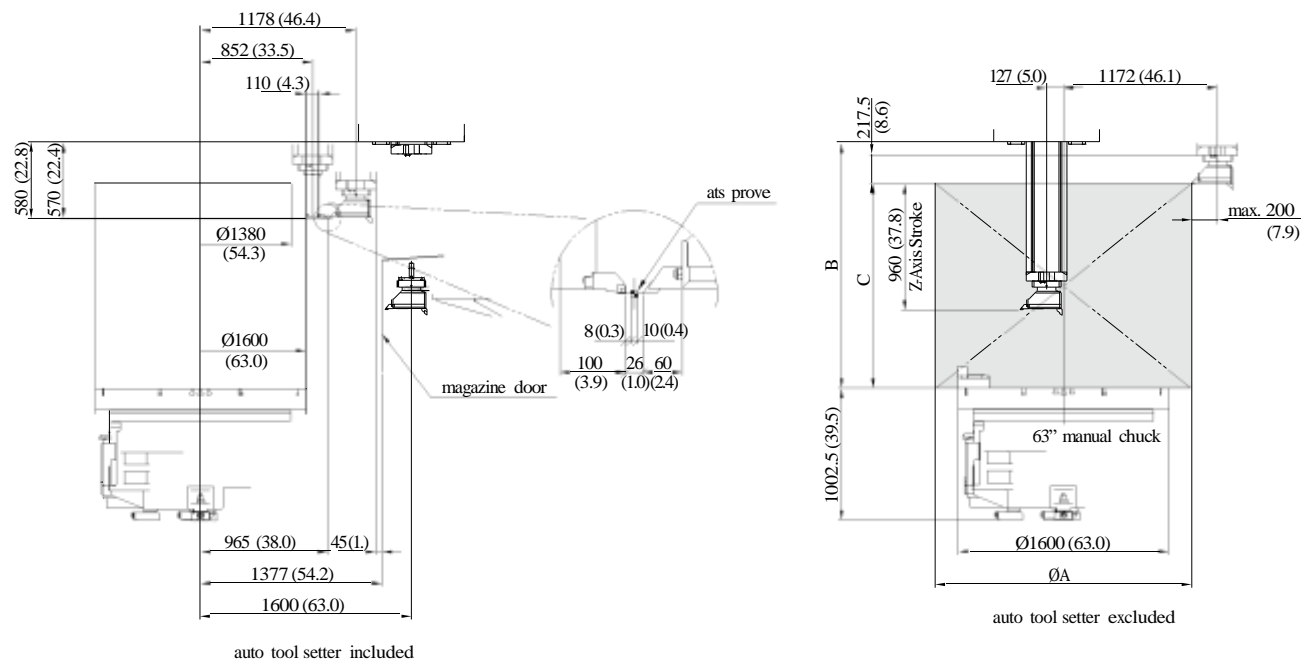


JOG mode

Working Range

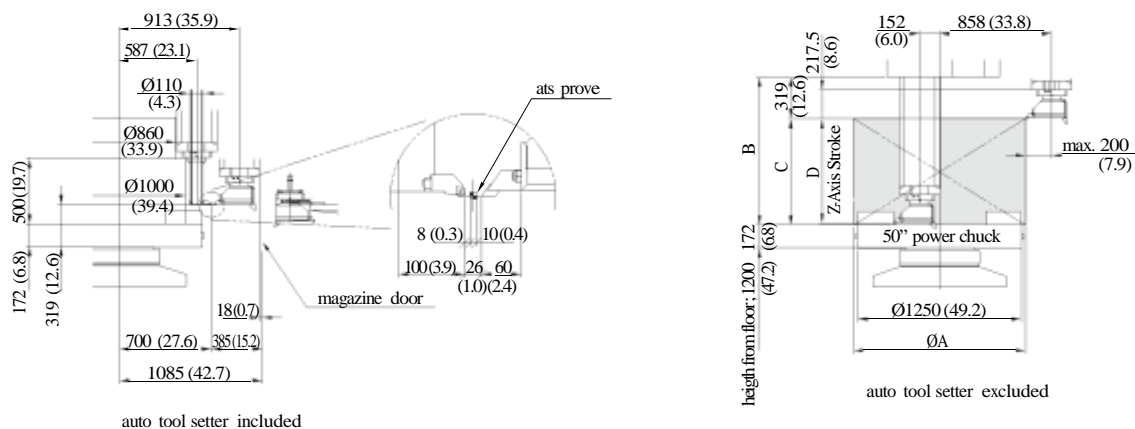
PUMA VTS1620 / VTS1620M

Unit: mm (inch)



	A	W-Axis 1 Step : 0		W-Axis 2 Step : 200		W-Axis 3 Step : 400		W-Axis 4 Step : 600		W-Axis 5 Step : 800	
		B	C	B	C	B	C	B	C	B	C
Face Tool Holder	2000 (78.7)	968 (38.1)	716 (28.2)	1168 (46.0)	916 (36.1)	1468 (57.8)	1116 (43.9)	1668 (65.7)	1316 (51.8)	1868 (73.5)	1516 (59.7)
OD Tool Holder	1940 (76.4)		756 (29.8)		956 (37.6)		1156 (45.5)		1356 (53.4)		1556 (61.3)
X-Long ID Tool Holder	2000 (78.7)		567 (22.3)		767 (30.2)		967 (38.1)		1167 (45.9)		1367 (53.8)

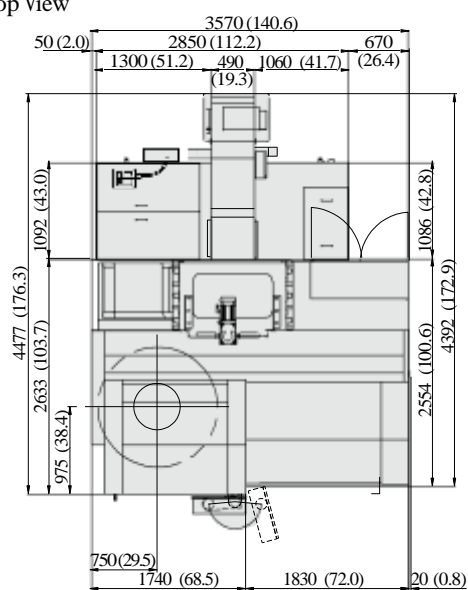
PUMA VTS1214 / VTS1214M



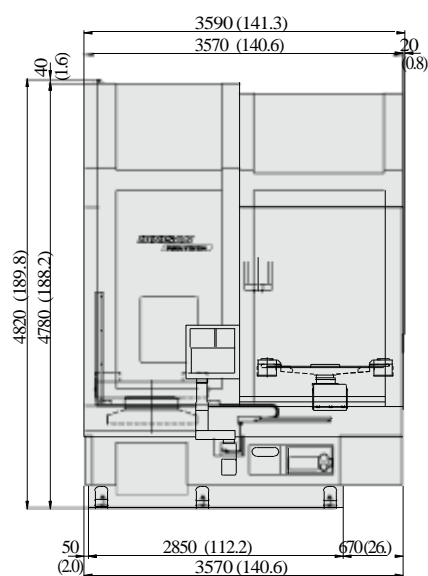
	A	W-Axis 1 Step : 0 mm			W-Axis 2 Step : 150 mm (5.9 inch)			W-Axis 3 Step : 300 mm (11.8 inch)			W-Axis 4 Step : 450 mm (17.7 inch)			W-Axis 5 Step : 600 mm (23.6 inch)		
		B	C	D	B	C	D	B	C	D	B	C	D	B	C	D
Face Tool Holder	1350 (53.1)	533 (21.0)	172 (6.8)	350 (13.8)	683 (26.9)	322 (12.7)	500 (19.7)	833 (32.8)	472 (18.6)	650 (25.6)	983 (38.7)	622 (24.5)	800 (31.5)	1133 (44.6)	772 (30.4)	800 (31.5)
OD Tool Holder	1316 (51.8)		214 (8.4)	350 (13.8)		364 (14.3)	500 (19.7)		514 (20.2)	650 (25.6)		664 (26.1)	800 (31.5)		814 (32.0)	800 (31.5)
X-Long ID Tool Holder	1350 (53.1)		23 (0.9)	350 (13.8)		173 (6.8)	500 (19.7)		323 (12.7)	650 (25.6)		473 (18.6)	800 (31.5)		623 (24.5)	800 (31.5)

PUMA VTS1214 / VTS1214M

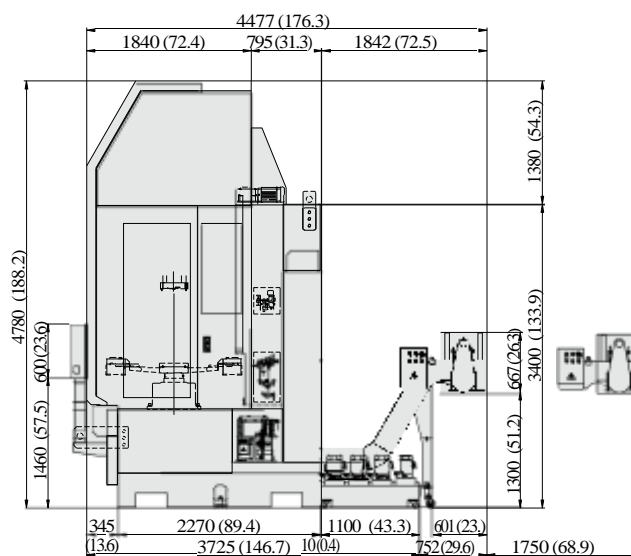
Top View



Front View



Side View



Machine Specifications

Features		Unit	PUMA VTS1620	PUMA VTS1620M	PUMA VTS1214	PUMA VTS1214M*	
Capacity	Swing over bed	mm (inch)	2000 (78.7)		1400 (55.1)		
	Swing over cross rail	mm (inch)	600 (23.6)		750 (29.5)		
	Max. Turning diameter	mm (inch)	2000 (78.7)		1350 (53.1)		
	Max. Turning height	mm (inch)	1556 (61.3)		814 (32.0)		
	Max. Turning weight	kg (lb)	10000 (22045.9)		4000 (8818.4)		
Travels	Travel distance	X-axis (To left from table center)	mm (inch)	127 (5.0)		152 (6.0)	
		(To right from table center)	mm (inch)	1600 (63.0)		1298 (51.1)	
		Z-axis	mm (inch)	960 (37.8)		800 (31.5)	
		C-axis	deg	-	360	-	360
		W-axis	mm (inch)	800 (31.5)		600 (23.6)	
Feedrates	Rapid Traverse Rate	X-axis	m/min	12		12	
		Z-axis	m/min	12		12	
		C-axis	deg/min	-	900	-	900
Ram	Ram size		mm (inch)	308 × 250 (12.1 × 9.8)		308 × 250 (12.1 × 9.8)	
	Min. through hole inside diameter		mm (inch)	320 (12.6)		320 (12.6)	
Table	Max. Spindle speed		r/min	250		630	
	Table size			1600 (63")		1000 (40")	
	Spindle bearing diameter		mm (inch)	685.8 (27.0)		240 (9.4)	
Rotary Tool	Max. rotary tool spindle torque		ea	-	262 {687}	-	262 {687}
	Max. roatry tool spindle speed		mm (inch)	-	3000 {2000} (118.1 {78.7})	-	3000 {2000} (118.1 {78.7})
Tool magazine	Rotary tool bearing diameter		mm (inch)	-	100 (3.9)	-	100 (3.9)
	Tool storage capa.		stations	18 {24}		15 {24}	
	Tool size	Face OD		32 × 32		32 × 32	
ID			25 × 25		25 × 25		
Motors	Table motor power		kW (Hp)	45 (60.3) / 37.5 (50.3) (30min/cont.) {60 (80.5) / 45 (60.3) (10min/cont.)}		60 (80.5) / 55 (73.8) / 45 (60.3) (10min/30min/cont.)	
	Rotary tool motor power		kW (Hp)	-	18.5 (24.8) / 15 (20.1) (30min/cont.) {15 (20.1) / 11 (14.8) (30min/cont.)}	-	18.5 (24.8) / 15 (20.1) (30min/cont.) {15 (20.1) / 11 (14.8) (30min/cont.)}
Power source	Electric power supply(rated capacity)		kVA	90	100	90	110
Machine Dimensions	Height		mm (inch)	5639 (222.0)		4820 (189.8)	
	Width		mm (inch)	5200 × 3451 (204.7 × 135.9)		3590 × 3725 (141.3 × 146.7)	
	Weight		kg (lb)	30000 (66137.7) 31000 (68342.3)		25500 (56217.0) 26000 (57319.3)	
NC CONTROL			DOOSAN Fanuc i-series / Fanuc 23i				

NC CONTROL

DOOSAN Fanuc i series / Fanuc 32i

* For machining accuracy of X/C axes contouring, please contact Doosan.
{ } : Option

Standard Feature

- 3 jaws hydraulic chuck (VTS1214/M)
- 4 jaws manual chuck (VTS1620/M)
- ATC shower coolant
- Bed shower coolant
- Column ladder and rail (VTS1620/M)
- Crossrail positioning unit
- Hydraulic unit
- Leveling bolts and plates
- Lubricant supplier
- Machine installation parts
- M code program (Drive vertical crossrail)
- Ram air blast
- Ram shower coolant
- Splash guard
- Standard tool holder
- Table cooling system (VTS1620/M)
- Tool clamp air seating checker

Optional Feature

- 50" hydraulic chuck (VTS1214/M)
- 50" combination chuck (VTS1214/M)
- 63" combination chuck (VTS1620)
- 70 bar coolant
- Air conditioner
- Automatic front door
- Auto tool setter
- Chip bucket, chip conveyor
- Coolant gun
- Linear scale (X, Z-axis)
- Line filter for coolant
- Mist collector (VTS1214/M)
- Oil Skimmer (belt type)
- Parts probe
- Signal tower
- Special chuck

• The specifications and information above-mentioned may be changed without prior notice.
• For more details, please contact Doosan

NC Unit Specifications

DOOSAN Fanuc i series

Standard Specifications

AXES CONTROL

- Controlled axes	X, Z, C (X, Z, C, E - VT)
- Simultaneously controllable axes	3 axes
- Axis control by PMC	
- Backlash compensation	0 ~ + 9999 pulses
- Backlash compensation for each rapid traverse and cutting feed	
- Chamfering on/off	
- Cs contouring control	
- HRV2 control	
- Inch / Metric conversion	
- Increment system 1/10	
	0.0001 / 0.00001 mm/inch
- Interlock	All axes / each axis
- Least input command	0.001 / 0.0001 mm/inch
- Machine lock	All axes / each axis
- Overtravel	
- Position switch	
- Stored stroke check 1	
- Stored stroke check 2, 3	

OPERATION

- Automatic operation(memory)	
- Buffer register	
- DNC operation(Reader/puncher interface is required)	
- Handle incremental feed	X1, X10, X100
- JOG feed	
- Manual handle feed	1 unit
- Reference position setting without dog	
- Wrong operation prevention	

INTERPOLATION FUNCTIONS

- 1st. reference position return	Manual, G28
- 2nd. reference position return	G30
- 3rd/4th. reference position return	G30
- Circular interpolation	G02
- Continuous threading	
- Dwell (per sec)	G04
- Linear interpolation	G01

- Polar coordinate interpolation	
- Positioning	G00
- Reference position return check	G27
- Thread cutting / Synchronous cutting	

FEED FUNCTION

- Automatic acceleration / deceleration	
- Cutting feedrate clamp	
- Feedrate override (10% unit)	0 - 200 %
- Jog feed override (10% unit)	0 - 2000 mm/min
- Override cancel	
- Rapid traverse override	F0.25, 100 %
- Tangential speed constant control	

AUXILIARY / SPINDLE SPEED FUNCTION

- Constant surface speed control	
- High speed M/S/T interface	
- Spindle orientation	

PROGRAM INPUT

- Absolute/incremental programming	
- Addition of custom macro common variables	
- Automatic coordinate system setting	
- Canned cycle for drilling / Turning	
- Circular interpolation by R programming	
- Coordinate system setting	G50
- Custom macro	
- Decimal point programming/	
- Diameter/radius programming (X axis)	
- Direct drawing dimension programming	
- Direct of coordinate system shift	
- G code system A/B/C	
- Input unit 10 time multiply	
- Maximum program dimension	+9 digit
- Multiple repetitive canned cycle	G70 - G76
- Multiple repetitive canned cycle II	
- Optional block skip	1 piece
- Optional block skip (Soft operator's panel)	9 pieces
- Plane selection	G17, G18, G19
- Pocket calculator type decimal point programming	

- Program number	O4 digit
- Program stop / end (M00, M01 / M02, M30)	
- Programmable data input	G10
- SUB program call	4 folds nested
- Tape code : ISO / EIA auto recognition	EIA RS422/ISO840
- Tape format for FANUC Series 10/11	
- Work coordinate system	G52 - G59

TOOL FUNCTION / TOOL COMPENSATION

- Automatic tool offset	
- Direct input of offset value measured B	
- Extended tool life management	
- T - code function	T2 +2 digits
- Tool geometry / wear compensation	
- Tool life management	
- Tool nose radius compensation	
- Tool offset	G43, G44, G49
- Tool offset pairs	64 pairs

EDITING OPERATION

- Extended part program editing	
- Number of registered programs	400 ea
- Part program storage length	1280 (512KB) m
- Program protect	

SETTING AND DISPLAY

- Actual cutting feedrate display	
- Alarm history display	
- Directory display and punch for each group	
- Display of spindle speed and T code at all screens	
- Multi-language display	
- Operating monitor screen	
- Parameter setting and display	
- Program name display	31 characters
- Run hours / parts count display	
- Self-diagnosis function	
- Spindle setting screen	
- Soft operator's panel	
- Tool path graphic display	

OTHERS

- Cycle start and lamp	
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- Display unit	10.4" Color TFT LCD (except Lynx220M/300M) 8.4" Color LCD : Lynx220M/300M
- Feed hold and lamp	
- NC and servo ready	
- PCMCIA port in the front of LCD display unit	
- PMC system	0iD-PMC
- Reset / rewind	

OPERATION GUIDANCE FUNCTION

- eZ Guide i	Only 10.4 Color LCD
- Manual Guide Oi	Only 8.4 Color LCD

INTERFACE FUNCTION

- Ethernet function	Embedded ethernet
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Optional Specifications

AXIS CONTROL

- Controlled axes expansion(total)	Max. 4 axes
- Simultaneous controlled axes expansion(total)	Max. 4 axes

OTHERS

- 10.4" Color TFT LCD (Only Lynx220M/300M)	
- Advanced preview control	
- Dynamic graphic display	Only Lynx-series
- Fast ethernet / Data server	
- Helical interpolation	
- High speed skip function	
- Manual handle interruption	
- Manual handle feed	2 units
- Number of tool offset	99 pairs

ROBOT INTERFACE

- Robot interface with PMC I/O module	
(Hardware between PMC I/O modules)	
- Robot interface with PROFIBUS-DP	

TOOL FUNCTION / TOOL COMPENSATION

- Tool Load Monitoring system	
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FANUC 32i

Standard Specifications

AXES CONTROL

- Controlled axes	X, Z
- Simultaneous controlled axes	2 axes
- Axis control by PMC	
- Backlash compensation	0 ~ + 9999 pulses
- Backlash compensation for each rapid traverse and cutting feed	
- Controlled path	1 path
- HRV2 control	
- Inch / Metric conversion	
- Interlock	All axes / each axis
- Least input command	0.001 / 0.0001 mm/inch
- Mirror image	
- Servo off	
- Stored stroke check 1	
- Torque control	
- Unexpected disturbance torque detection function	

OPERATION

- Automatic operation(memory)	
- Buffer register	
- DNC Operation with Memory card	
- Handle incremental feed	X1, X10, X100
- Program restart	

INTERPOLATION FUNCTIONS

- 1st. Reference position return	Manual, G28
- 2nd. reference position return	G30
- Circular interpolation	G02
- Continuous threading	
- Dwell (per sec)	G04
- Linear interpolation	G01
- Positioning	G00
- Reference position return check	G27
- Thread cutting / Synchronous cutting	

FEED FUNCTION

- Automatic acceleration / deceleration	
- Cutting feedrate clamp	
- Feed per revolution	
- Feedrate override (10% unit)	0 - 200 %
- Jog feed override (10% unit)	0 - 2000 mm/min

- Override cancel	
- Rapid traverse override	F0, 25, 100 %
- Tangential speed constant control	

AUXILIARY / SPINDLE SPEED FUNCTION

- Constant surface speed control	
- M - code function	M3 digits
- Spindle orientation	

PROGRAM INPUT

- Absolute/incremental programming	
- Automatic coordinate system setting	
- Canned cycle for drilling / Turning	
- Canned cycle	
- Circular interpolation by R programming	
- Coordinate system setting	G50
- Coordinate system shift	
- Custom macro	
- Decimal point programming/	
- Pocket calculator type decimal point programming	
- Diameter/radius programming (X axis)	
- Direct drawing dimension programming	
- G code system A	
- G code system B/C	
- Input unit 10 time multiply	
- Macro executor	
- Maximum program dimension	+9 digit
- Multiple repetitive canned cycle	G70 - G76
- Multiple repetitive canned cycle II	
- Optional block skip	9 pieces
- Plane selection	G17, G18, G19
- Program file name	32 characters
- Programmable data input	G10
- Sequence number	N8 digit
- SUB program call	10 folds nested

TOOL FUNCTION / TOOL COMPENSATION

- Automatic tool offset	
- Direct input of offset value measured B	
- T - code function	T2 + 2 digits
- Tool life management	
- Tool nose radius compensation	

- Tool offset	G43, G44, G49
- Tool offset pairs	+6 digits : 64 pairs
- Tool offset value counter input	

EDITING OPERATION

- Extended part program editing	
- Number of registered programs	500 ea
- Part program editing	
- Part program storage length	640 (256 KB) m

SETTING AND DISPLAY

- Actual cutting feedrate display	
- Alarm history display	
- Display of spindle speed and T code at all screens	
- Operation history display	
- Operating monitor screen	
- Parameter setting and display	
- Periodic maintenance screen	
- Program comment display	31 characters
- Run hours / part count display	
- Self-diagnosis function	
- Servo waveform display	
- Spindle setting screen	

OTHERS

- Cycle start and lamp	
- Display unit	10.4" Color TFT LCD
- Feed hold and lamp	
- NC and servo ready	
- PMC system	32i-PMC
- Reset / rewind	

OPERATION GUIDANCE FUNCTION

- eZ Guide i (Conversational Programming Solution)	
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INTERFACE FUNCTION

- Ethernet function	Embedded ethernet
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Optional Specifications

AXIS CONTROL

- Stored pitch error compensation	
- Stored stroke 2 and 3	
- Stroke limit check before move	

DATA INPUT/OUTPUT

- DNC1 control	
- External data input	
- Fast ethernet / Data server	
- Remote buffer	

OTHERS

- High speed skip function	
- Manual handle interruption	
- Stored pitch error compensation	



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- The specifications and information above-mentioned may be changed without prior notice.
- For more details, please contact Doosan.

